

III. REMARKS

Claims 1-20 are pending in this application. Claims 1, 8, 11, 16, 17, and 20 have been amended, while claims 2, 3, and 12 have been cancelled. Applicants do not acquiesce in the correctness of the rejections and reserve the right to present specific arguments regarding any rejected claims not specifically addressed. Further, Applicants reserve the right to pursue the full scope of the subject matter of the original claims in a subsequent patent application that claims priority to the instant application.

Reconsideration in view of the following remarks is respectfully requested.

In the Office Action, claims 1-3 and 7 are rejected under 35 U.S.C. 102(b) as being allegedly anticipated by Nitta et. al. (US Pub. No. 2001/0054764), hereinafter “Nitta.” Further, claims 4-5, 11-13, 15, 17, and 19 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Nitta in view of Cooney, III et. al. (US Pub. No. 2004/0018714), hereinafter “Cooney.” The Office Action also rejected claims 8, 11, 16, 17, and 20 under 35 U.S.C. 103(a) as being allegedly unpatentable over Nitta in view of Cowley et. al. (US Pub. No. 2004/0058526), hereinafter “Cowley.” Further, claims 6, 11, 14, 17, and 18 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Nitta in view of Tsai et al. (US Pub. No. 2003/0077897), hereinafter “Tsai.” Finally, claims 9-10 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Nitta in view of Te Velde (Pat. No. 4561173). Applicants respectfully assert that the amended claims are in condition for allowance.

With respect to claim rejections under 35 U.S.C. 102(b), currently amended claim 1 reads, “forming an opening for semiconductor structure in a dielectric layer on a substrate, wherein the opening includes a wiring opening and a via opening...” (Claim

1). The Office asserts that Nitta discloses “wherein the opening includes at least one wiring line opening and at least one via.” (Office Action at p. 3, citing FIGS 6A-D)(emphasis added). The Office uses for support, FIGS 6A-D and corresponding paragraphs 72-79. (Office Action at p. 3). In these figures and paragraphs, as well as in the balance of Nitta, element “13” is labeled as a “wiring pattern groove.” (Nitta at FIGS A-D, para. 40, 44, 72-79, etc.). The consistent use of “wiring pattern groove” strongly suggests that Nitta does not contemplate a process that forms both a wire and via opening. Neither FIGS 6A-D nor their corresponding paragraphs disclose a vertical connection between stacked up interconnect metal lines. Looking from the side view in these figures, it is clear that one end of the “wiring pattern groove” is contained in the dielectric, and thus, does not form the necessary via vertical connection. As such, Nitta does not teach each and every element of the claimed invention, and Applicants respectfully request withdrawal of these rejections.

Further, the Office asserts that Nitta discloses, “wherein the void extends along a side of the at least one via...” (Office Action at p. 3). The Office uses for support, FIGS 6A-D. (Id.) These figures show a void extending alongside a “wiring pattern groove,” labeled as element “13.” (FIGS 6A-D). As argued above, the “wiring pattern groove” is not, and does not include, a via. As such, the void that extends along the “wiring pattern groove” in FIGS 6A-D does not extend along a via, and most certainly does not “extend[s] along a side of the contact via and the wire...” (Claim 1). Therefore, Nitta does not teach each and every element of the claimed invention. As such, Applicants respectfully request withdrawal of these rejections.

Finally, the Office asserts that Nitta discloses “performing a directional etch on the sacrificial layer to form a sacrificial layer sidewall on the opening after depositing the sacrificial layer...” The Office uses for support, FIG 6B and paragraph 74 of Nitta. However, Nitta discloses, “[t]he SiN film is selectively removed by anisotropic etching and left only on each sidewall of the groove...” (Para. 74). Nitta does not disclose the use of “a directional etch on the sacrificial layer...” Anisotropic and directional etching are distinct terms known to those with skill in the art, and are not interchangeable. As Nitta discloses “anisotropic etching,” it necessarily does not disclose “directional” etching. Therefore, Nitta does not teach each and every element of the claimed invention, as required by 35 USC 102(b). Accordingly, Applicants respectfully request withdrawal of the rejection.

With respect to claim rejections under 35 U.S.C. 103(a), the Office asserts that Nitta “discloses most of the limitations of the claims as discussed...” (Office Action at p. 4, 5, and 7). The above arguments are hereby incorporated by reference with respect to independent claims 11 and 17.

Dependent claims 8, 16, and 20 have been amended to overcome the Office’s rejection over Nitta in view of Cowley. (Office Action at p.6). As amended, these claims read, “wherein the sacrificial layer includes one of the group consisting of: aluminum (Al) and silicon dioxide (SiO₂).” (Claims 8, 16, and 20). In its rejection, the Office uses for support, FIGS 2-9 and paragraph 27 of Cowley. (Id.). However, Cowley discloses “[s]acrificial layer can comprise Ti, Ta, or TaN or any other liner material. (Para. 27). As such, amended claims 8, 16, and 20 are in condition for allowance. Accordingly, Applicants respectfully request withdrawal of these rejections.

The dependent claims are believed allowable for the same reasons stated above,
as well as for their own additional features.

Applicants respectfully submit that the Application as presented is in condition
for allowance. Should the Examiner believe that anything further is necessary in order to
place the application in better condition for allowance, the Examiner is requested to
contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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